

## CLAIMS:

1. A fluidising admixture for use with sprayable cementitious compositions, the admixture consisting of

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(1) 2-phosphonobutane-1,2,4-tricarboxylic acid;

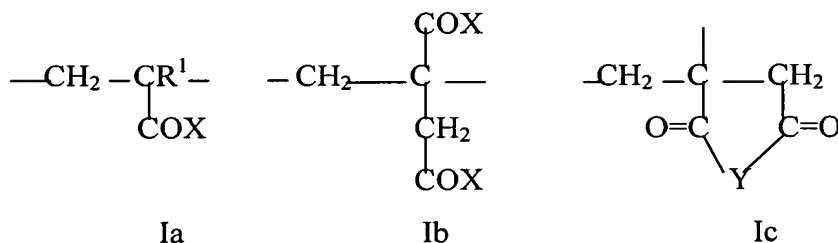
(2) optionally, citric acid; and

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(3) at least one polymer derived from ethylenically-unsaturated mono-or dicarboxylic acids, and characterised in that the polymer consists of

a) 51-95 mole % of moieties of formula 1a and/or 1b and/or 1c

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wherein  $R^1$  = hydrogen or a  $C_{1-20}$  aliphatic hydrocarbon residue;

$X = O_a M, -O-(C_m H_{2m} O)_n - R^2, -NH-(C_m H_{2m} O)_n - R^2,$

$M$  = hydrogen, a mono-or divalent metal cation, an ammonium ion or an organic amine residue;

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$a=0.5$  or  $1$ ;

$R^2$  = hydrogen,  $C_{1-20}$  aliphatic hydrocarbon,  $C_{5-8}$  cycloaliphatic hydrocarbon or optionally substituted  $C_{6-14}$  aryl residue;

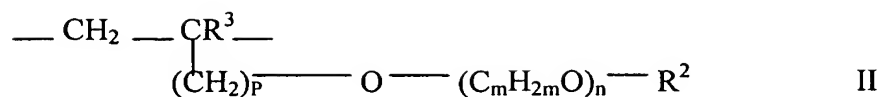
$Y = O, NR^2$ ;

$m = 2-4$ ; and

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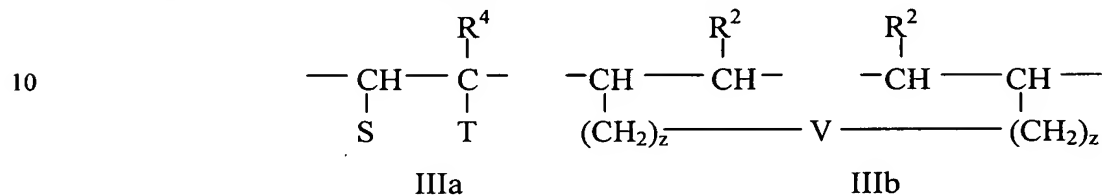
$n = 0-200$

b) 1-48.9 mole% of moieties of the general formula II

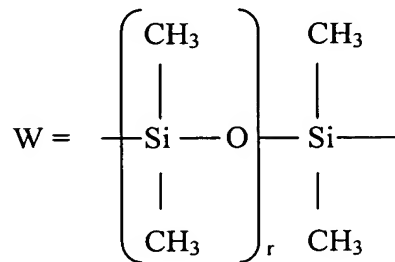


wherein  $\text{R}^3$  = hydrogen or  $\text{C}_{1-5}$  aliphatic hydrocarbon;  
 $p = 0-3$ ; and  
 $\text{R}^2$  has the meaning given previously;

c) 0.1-5 mole % of moieties of Formulae IIIa or IIIb

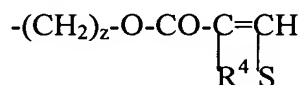
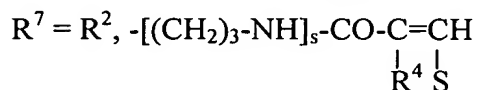
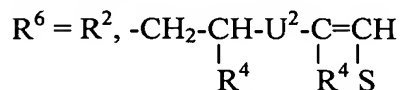


wherein  $\text{S} = \text{H}, -\text{COO}_a\text{M}, -\text{COOR}^5$   
 $\text{T} = \text{U}^1\text{---}\underset{\substack{| \\ \text{CH}^3}}{(\text{CH-CH}_2\text{-O})_x\text{---}(\text{CH}_2\text{-CH}_2\text{O})_y}\text{R}^6$   
 $-\text{W-R}^7$   
 $-\text{CO-[NH-(CH}_2)_3]_s\text{---W-R}^7$   
 $-\text{CO-O-(CH}_2)_z\text{---W-R}^7$   
 $-(\text{CH}_2)_z\text{---V---}(\text{CH}_2)_z\text{---CH=CH-R}^2$   
 $= -\text{COOR}^5$  when  $\text{S}$  is  $-\text{COOR}^5$  or  $\text{COO}_a\text{M}$   
 $\text{U}^1 = -\text{CO-NH-}, -\text{O-}, -\text{CH}_2\text{O-}$   
 $\text{U}^2 = -\text{NH-CO-}, -\text{O-}, -\text{OCH}_2\text{-}$   
 $\text{V} = -\text{O-CO-C}_6\text{H}_4\text{-CO-O-}$  or  $-\text{W-}$



$\text{R}^4 = \text{H}, \text{CH}_3$

$R^5$  = a  $C_{3-20}$  aliphatic hydrocarbon residue, a  $C_5-C_8$  cycloaliphatic hydrocarbon residue or a  $C_6-14$  aryl residue;



wherein

$r = 2-100$

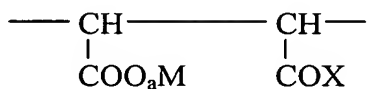
$s = 1, 2$

$z = 0-4$

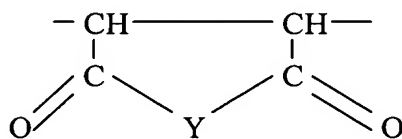
$x = 1-150$

$y = 0-15$

d) 0-47.9 mole % of moieties of the general formula IVa and / or IV b:



IVa



IVb

wherein a, M, X and Y have the significances hereinabove defined.

2. A fluidising admixture according to claim 1, in which

a) the moiety is according to formula Ia;

$R^1, R^2$  are independently H or  $CH_3$ ;

$X = O_a M, -O-(C_m H_{2m}O)_n-R^2$

$M = H$  or a mono-or divalent metal cation;

$a = 1$ ;

$Y = O, NR^2$ ;

m= 2-3; and

n= 20-150;

b)  $R^2, R^3$  are independently H or  $CH_3$ ; and

p = 0-1;

c) the moiety is according to formula IIIa;

S = H,  $-COO_aM$ ,  $-COOR^5$

T =  $U^1-(CH-CH_2-O)_x-(CH_2-CH_2O)_yR^6$   
 $\quad \quad \quad |$   
 $\quad \quad \quad CH^3$

$-CO-[NH-(CH_2)_3]_s-W-R^7$

$-CO-O-(CH_2)_z-W-R^7$

$R^4, R^5$  are independently H,  $CH_3$ ;

$R^6 = R^2, -CH_2-\underset{\substack{| \\ R^4}}{CH}-U^2-\underset{\substack{| \\ R^4}}{C}=\underset{\substack{| \\ S}}{CH}$

$R^7 = R^2, -[(CH_2)_3-NH]_s-CO-\underset{\substack{| \\ R^4}}{C}=\underset{\substack{| \\ S}}{CH}$

$-(CH_2)_z-O-CO-\underset{\substack{| \\ R^4}}{C}=\underset{\substack{| \\ S}}{CH}$

wherein

$U^1 = -CO-NH-, -O-, -CH_2O-$

$U^2 = -NH-CO-, -O-, -OCH_2-$

x = 20-50;

y = 1-10; and

z = 0-2.

3. A fluidising admixture according to claim 2, in which

a) the moiety is according to formula Ia;

$R^1 = H$ ;

$R^2 = CH_3$ ;

X =  $O_a M$ ;

M = a mono-or divalent metal cation;

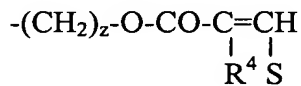
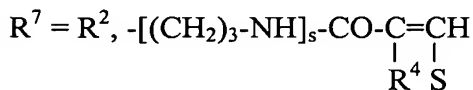
$n = 25-50;$

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$$\text{R}^6 = \text{R}^2, \text{-CH}_2\text{-}\underset{\text{R}^4}{\underset{|}{\text{CH}}}\text{-U}^2\text{-}\underset{\text{R}^4}{\underset{|}{\text{C}}}=\underset{\text{S}}{\underset{|}{\text{CH}}}$$

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$$U^1 = -\text{CO}-\text{NH}-;$$
$$U^2 = -NH-CO-, -O-, -OCH_2-$$

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x = 20-50;
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$y = 5-10$ ; and

$$z = 1-2.$$

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5. A method of spraying a cementitious composition by preparing a cementitious mix and conveying the mix to a spray nozzle, there being added to the mix at preparation an admixture according to claim 1.